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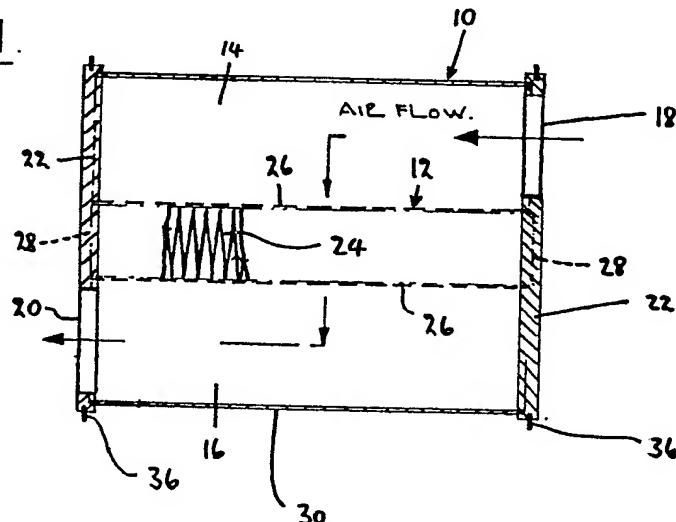
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## (54) Fluid filter

(57) An air filter for fitting inside a tube or duct comprises a tubular casing (10) which encloses a flat, pleated filter element (12) which extends lengthwise of the casing and divides it into two semi-cylindrical compartments (14 and 16), which are respectively open at (18) and (20) at opposite ends of the casing. The filtering area presented by the filter element (12) can be increased to any desired extent simply by increasing the lengths of the cylindrical wall (30) of the casing and the filter element (12). The casing has external annular seals (36) which engage the walls of the enclosing tube or duct (not shown). The filter element is moulded into the casing end walls and sealed to the side wall.

Fig. 1.



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Fig. 1.

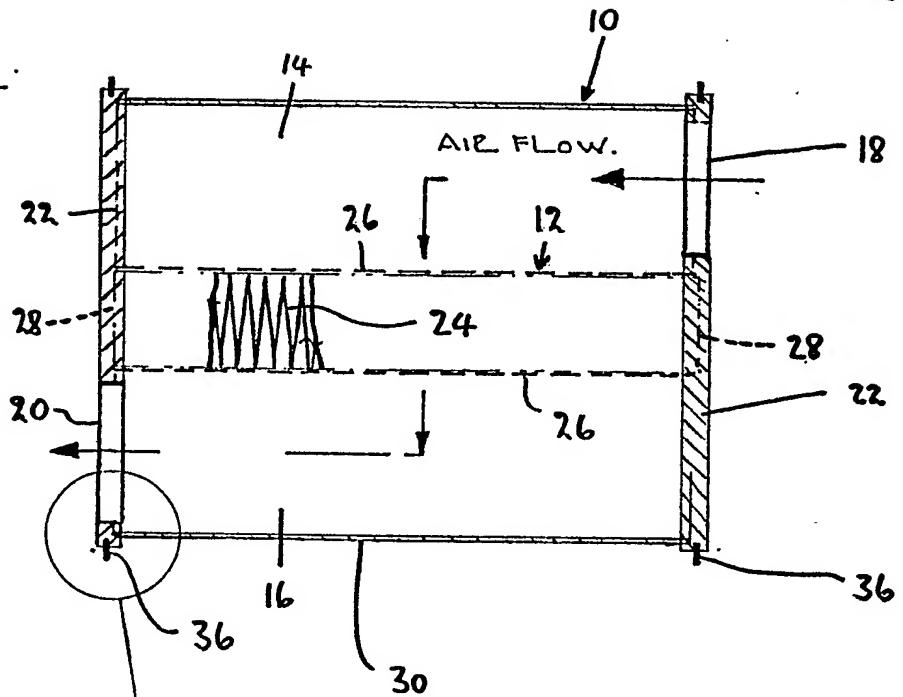


Fig. 3.

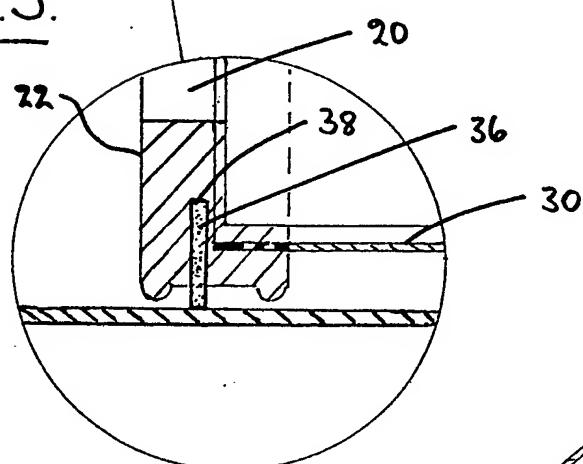
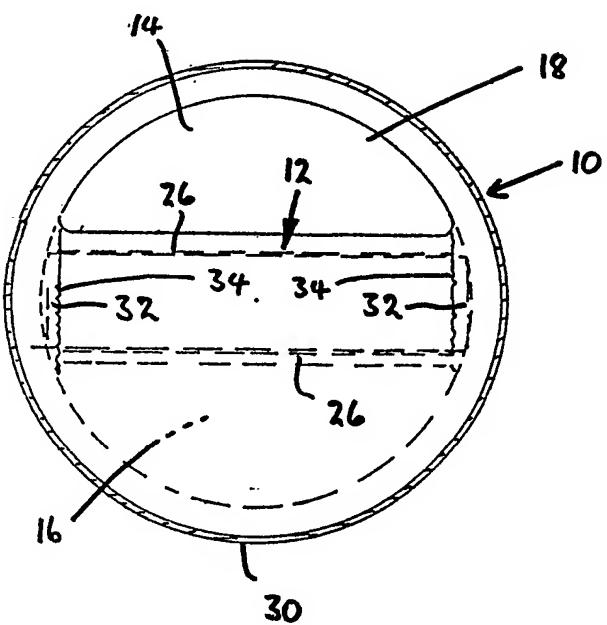


Fig. 2.



**SPECIFICATION**  
**Fluid filter**

This invention relates to fluid filters and is especially concerned with air filters.

The aim of the invention is to devise a fluid filter which can be removably fitted inside a tube, duct or generally tubular housing and which presents a large filtering surface to fluid passing through the filter. A further aim is to produce a filter of this construction which can be manufactured very simply in the factory.

To this end, a fluid filter for fitting inside a tube, duct or generally tubular housing comprises a tubular casing which is divided in two, longitudinally thereof, by a filter element and which has an opening at each end for the passage of fluid through the casing with one opening in communication with one side of the filter element and the other opening in communication with the other side of the filter element.

Preferably, the filter element is of planar construction and is so arranged in the tubular casing as to divide it into two equal compartments lying on opposite sides of a plane containing the longitudinal axis of the casing. The end openings in the casing can then take the form of part-circular openings in end walls of the casing.

In order that the filter may be easily inserted in and removed from the tube, duct or tubular housing in which it is fitted, annular flexible seals are provided at or near its ends. These seals flex very easily so as to reduce resistance to movement of the fluid filter as it is inserted or removed from the tube, duct or housing while at the same time providing a good fluid-tight seal.

A specific fluid filter in accordance with the invention is shown in the accompanying drawing, in which —

Figure 1 is a vertical section through the filter;  
Figure 2 is an end view of the filter; and  
Figure 3 shows a small part of Figure 1 on an enlarged scale.

The fluid filter shown in the drawing is intended to filter air contaminated with impurities, although it is to be understood that it could also be used to filter other gaseous fluids. More specifically, the illustrated filter has been devised for fitting inside a tube, duct or generally tubular housing.

The filter comprises a tubular casing 10 which is divided in two, longitudinally thereof, by a filter element 12. As will be seen from Figures 1 and 2, the filter element 12 is of planar construction and lies on a diagonal of the casing so that it divides the latter into two semi-cylindrical compartments 14 and 16. Fluid flows through the filter in the manner indicated by the arrows shown in Figure 1 and for this purpose the casing 10 is provided with openings 18 and 20 in end walls 22 of the casing.

The openings 18 and 20 are of part-circular form as shown in Figure 2, with the opening 18 in communication with the upper side of the filter element 12 and the opening 20 in communication with the lower side of the filter element.

In the particular filter shown in the drawing, the

filter element 12 comprises a filtering medium of air-filtering paper 24 which is folded to form pleats. It is to be understood however that other filtering media can be used in place of or in addition to such pleated paper. The filtering medium 24 is bounded at its top and bottom surfaces by air-permeable screens 26 which are preferably made of perforated metal sheets, expanded metal sheets or welded metal mesh.

The ends 28 of the filter element 12 are sealingly embedded in the material of the end walls 22 of the casing 10. This is made possible by moulding the end walls out of a suitable resin material, the ends of the filter element 12 being introduced into the material of the end walls 22 while the latter are still in a molten condition. The cylindrical wall 30 of the filter casing 10 similarly has its end portions embedded in the end walls 22. In addition to this, epoxy sealing resin is poured into the gaps 32 between the longitudinal edges 32 of the filter element 12 and the opposing inner surface of the cylindrical wall 30 of the casing 10 — see Figure 2.

In order to facilitate insertion and removal of the filter into and out of a tube, duct or tubular housing, the seals 36 provided on the peripheral portions of the end walls 20 of the filter casing 10 are formed to reduce resistance to movement of the filter in a tube, duct or tubular housing to a minimum while, at the same time, providing a good fluid-tight seal.

The seals 36 accordingly comprise disc-like sealing members having root portions which are received as a close fit in corresponding grooves 38 formed in the peripheral portions of the end walls 22. The outer peripheral portion of each seal 36 projects from the peripheral surface of its respective end wall 22 and is able to flex very easily due to the fact that each seal 36 is made of a soft rubbery material such as neoprene.

One advantage of the construction shown in the drawing is that the filter element 12 presents a comparatively large filtering area to the air entering the filter through the opening 18. Moreover, the filtering area can be increased to as great a figure as desired simply by increasing the length of the cylindrical wall 30 of the filter casing and increasing the length of the filter element 12 by a corresponding amount. This is not possible where the filtering medium extends transversely of the filter casing, as in that case the filtering area presented to the incoming fluid cannot easily be made greater than the cross-sectional area of the casing.

The openings 18 and 20 at the two ends of the casing can be provided with screens if that is desired, or they can be replaced by a plurality of holes. In each case, however, the opening or openings at one end of the casing will communicate with one side of the filter element while the opening or openings at the other end of the casing will communicate with the other side of the filter element.

**Claims**

1. A fluid filter, especially an air filter, for fitting inside a tube, duct or generally tubular housing

comprising a tubular casing which is divided in two, longitudinally thereof, by a filter element and which has an opening at each end for the passage of fluid through the casing with one opening in

5 communication with one side of the filter element and the other opening in communication with the other side of the filter element.

2. A fluid filter according to claim 1, in which the filter element is of planar construction and is so

10 arranged in the tubular casing as to divide it into two equal compartments lying on opposite sides of a plane containing the longitudinal axis of the casing.

3. A fluid filter according to claim 2, in which the end openings in the casing take the form of part-

15 circular openings in end walls of the casing.

4. A fluid filter according to any preceding claim, in which the ends of the filter element are sealingly embedded in end walls of the casing, the end walls being made by moulding them out of a resin

20 material with the ends of the filter element being introduced into the material of the end walls while the latter are still in molten condition during the moulding operation.

5. A fluid filter according to any preceding claim, 25 in which the longitudinal edges of the filter element and the oposing inner surface of the tubular casing are sealed to each other by an epoxy sealing resin which is poured into the gaps between them during manufacture of the fluid filter.

6. A fluid filter according to any preceding claim, 30 in which the outer periphery of the tubular casing is provided with disc-like sealing members having root portions which are received as a close fit in corresponding grooves formed in the tubular

35 casing, the outer peripheral portion of each sealing member thereby projecting from the peripheral surface of the tubular casing and being made of a soft rubbery material so as to be able to flex very easily.

7. A fluid filter according to any preceding claim, 40 in which the filter element comprises air-filtering paper which is folded to form pleats, the air-filtering paper being bounded by air-permeable screens.

8. A fluid filter substantially as described herein 45 with reference to the accompanying drawing.

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